Determinants of Usage of Age Appropriate Child Safety Seats in Connecticut

New Categories with Content for the TRCC Website

TRCC Website - http://www.ct.gov/dot/cwp/view.asp?a=2094&q=435916

August continued our active TRCC schedule with our first-ever PhD presentation focusing on a critical message regarding the proper use of child safety seats in Connecticut. **This slide presentation by Pina Violano, PhD, Injury Prevention and Research, Yale New Haven Hospital, begins on the next page (page 2) of this message**.

Please consult the TRCC Meeting slides for our traditional traffic records update, 9th and proposed 10th Year safety data improvement projects, Data Linkage Subcommittee July meeting update, new TRCC website, and save-the-dates for September and October.

New TRCC Website – as discussed this month, we are happy to announce new categories with content for the TRCC website; something that has been in the works for this past year. The new content offers more information up-front about the TRCC; including recent meetings, stakeholder contact information, the TRCC's Charter, the current Traffic Records Strategic Plan, the recent TRCC meeting with a welcome by the Commissioner of the Department of Public Health, and a recent meeting of the Data Linkage Subcommittee.

The new content also includes numerous reference material documents, including standards and guidelines, and NHTSA's assessment advisory, which will provide the guidelines for system improvements as well as an assessment in 2017 regarding the progress being made in traffic records system improvements in the State.

With the success of the electronic citation, progress is being made in the expansion of this valuable tool to include electronic warnings as well as summons arrests. A link is devoted to ongoing updates regarding the traffic enforcement update.

Electronic crash reporting remains a hot topic for the State. A dedicated link is provided to the ongoing implementation of the MMUCC PR-1 Rollout.

Please Save the Date – September TRCC Meeting!

Tuesday, September 22 –9:30am till 11:30am, Conference Room B, ConnDOT Headquarters. As we've discussed, the fiscal end-of-year is rapidly approaching, as we prepare for the start-up of our 10th Year Safety Data Improvement projects in October.

Other Save the Date(s)

October Strategic Highway Safety Planning (SHSP) Peer Exchange: Oct 7-8, CCSU in New Britain, Hosted by ConnDOT – **to register, go to: http://ct-shsp-peer-exchange.eventbrite.com**, no cost to attend, space is limited, registration ends Friday, Sept 25, 2015.

41st Annual National Traffic Records Forum, October 25-28, Costa Mesa, California – for further information, check out http://www.ATSIP.org

Determinants of Usage of Age Appropriate Child Safety Seats in Connecticut

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TRCC Committee Meeting
August 18, 2015

YALE-NEW HAVEN HOSPITAL
Trauma Center

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Background

- Motor Vehicle Crashes (MVC) are one of the leading causes of unintentional injury deaths for children ages 1-15 years. (CDC,CPS: Fact Sheet, 2014)
  - The second leading cause of unintentional injury death for children ages 1-4 years
  - The fourth leading cause for infants (those under the age of one year) (National Center for Injury Prevention and Control [NCIPC], Centers for Disease Control and Prevention [CDCP], 2010)
  - In 2011 alone, 650 children ages ≤12 years died as occupants in MVCs, with a 1/3 unrestrained and app 148,000 injured (Ferguson, & Walker, 2013; NCIPC, CDCP, Vital Signs [VS], 2014).

Background

- Child safety restraint seats (CSRS)encompasses both rear and forward facing car seats as well as booster seats.
- CSRS requirements vary based on age, weight and height (usually 3 stages). Infants (under the age of 1 yr) using rear facing seat; toddlers(greater than 1yr and less than 4 years) using forward facing safety seats and older children (greater than 4 yr and up to 8 yrs) using booster seats.
- The evolution of child passenger safety seats, legislation and advocacy in the US has had a profound impact on the safety of children who are transported in motor vehicles (Shelness & Charles, 1975).
- In 1962, Leonard Rivkin patented the first child car seat in the United States whose sole purpose was protecting the child from injury within a motor vehicle(US Patent Office, March 5, 1962).

First Car Seat Patent

Oct. 22, 1963 L. RIVKIN 3,107,942

INFANT'S SEAT

Filed March 5, 1962

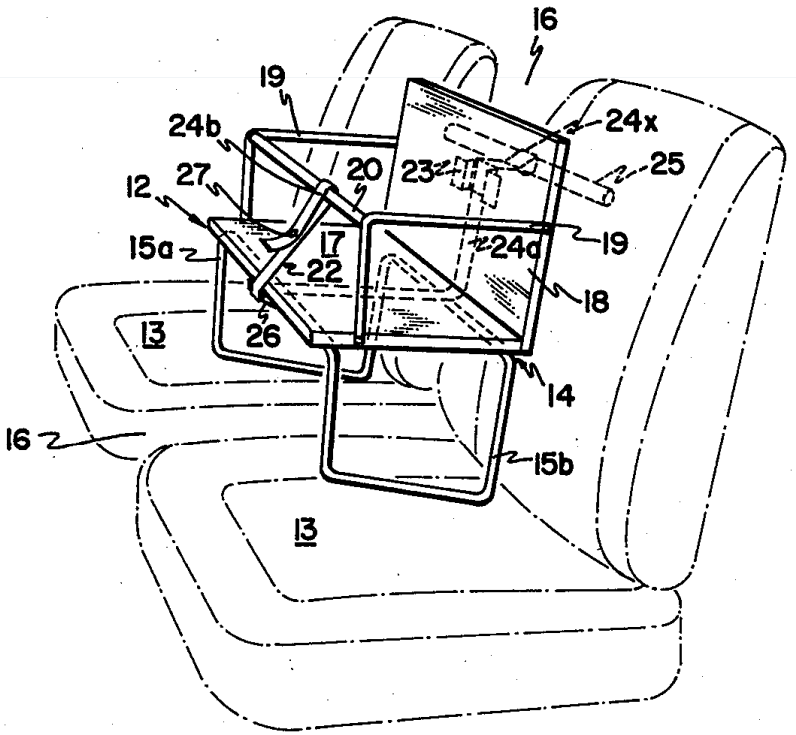


FIG. 1

Background

- In 1966 Ralph Nader's book "Unsafe at Any Speed" helped push matching Highway Safety Acts in 1966 and 1970 that empowered the US DOT to set and regulate federal vehicle safety standards (National PTA (U.S.), & United States, 1986).
- In 1970, the DOT created the National Highway Traffic Safety Administration (NHTSA) to perform these duties (US DOT, 2014).
- In 1971 the first Federal Child Restraint System standard was issued: Federal Motor Vehicle Safety Standard (FMVSS) 213 (NHTSA, 1999).
- In 1978, Tennessee became the first state to pass a child passenger safety law that required parents to place their infants in child restraint systems that met Federal Standards (Bae, Anderson, Silver, & Macinko, 2014).

Child Safety Restraint Systems (CSRS)

- CSRSs can be an effective injury prevention intervention for children involved in a MVC. (Durbin, CIVPP, 2011a)

- Use of CSRSs have been shown to reduce the risk of death of children being transported in passenger cars by as much as 71% for infants, 54% for toddlers 1-4 years of age. (NCIPC, CDCP, VS, 2014; NHTSA, Children, 2014a; CDC, CPS: Fact Sheet, 2014; Sauber-Schatz, & West, 2014)

- For children 4-7 years of age, the use of booster seats has been found to reduce the injury risk by 45% compared to seat belt use alone. (NCIPC, CDCP, VS, 2014; (Durbin, Committee on Injury, Violence, and Poison Prevention [CIVPP], 2011a; Durbin, CIVPP, 2011b; Sauber-Schatz, & West, 2014)

American Academy of Pediatrics

- The American Academy of Pediatrics (AAP) recommends children ride rear-facing as long as possible.
- Newer child restraints that are being produced have higher weight and height limits to make this easier. (Durbin, CIVPP, 2011a)
- Back center seat of the car is usually the safest place for a child restraint. It is the furthest point from impact and intrusion (side). (Durbin, CIVPP, 2011a)
- The vehicle manual should always be referred to for suggested placement of the seat. The seat should not be placed in front of an active airbag, if at all possible. (Durbin, CIVPP, 2011a)

Types of Child Safety Seats

"INFANT-ONLY" CAR SEATS

COMBINATION CAR SEAT

CONVERTIBLE CAR SEATS

BELT POSITIONING BOOSTER SEAT (BPB)

Connecticut's Child Passenger Safety Law

- Connecticut General Statutes § 14-100a, specifically Public Act 05-58, which went into effect October 1, 2005
  - Children under the age of one year of age and weighing less than 20 pounds must be in a rear-facing seat;
  - Children under seven years of age and weighing less than 60 pounds must ride in a CSRS;
  - After a child exceeds these limits, s/he must be secured in a booster seat with a lap and shoulder belt until they outgrow the booster seat
  - Adult safety belt is permissible for children 7-15 years who weigh greater than 60 pounds". (Conn.Gen Stat.,2006)

Lessons Learn from the Literature Review

- All 50 states, Puerto Rico, and the District of Columbia have some form of legislation that requires the use of the restraints by certain groups of children, but they all differ (NCIPC, CDCP, VS, 2014; GHSA, 2014).
- Child passenger restraint laws that increase the age that is required for car seat or booster seat use result in more children being restrained and less injuries and fatalities (CDC, CPS: Fact Sheet, 2014).
- Levels of public awareness of a new restraint law correlate with more children being restrained (CDC, CPS: Fact Sheet, 2014).
- However, sustaining compliance after implementation of child passenger legislation remains challenging.

Lessons Learn from the Literature Review

- In spite of over a decade of legislative efforts, MVCs remain one the major causes of death for children under 12 years of age (NCIPC, CDCP, VS, 2014).
- 1/3 of the children in MVC who died were not restrained (CDC, CPS: Fact Sheet, 2014; Sauber-Schatz, & West, 2014).
- Properly used CSRS and seat belts can save lives, but there are numerous factors that need to be considered to ensure proper use CSRS selection, vehicle seating selection (front seat versus back seat), and seating position (rear passenger side, directly behind driver's seat and middle seat) (Durbin, CIVPP-Technical Report, 2011a).

Lessons Learn from the Literature Review

- With an increase in restraint use, there was also an increase in the rate of premature transition to booster seat or seat belt.
- Booster seat law show a comprehensive return on investment of 9.4 to 1 and were less likely to be hospitalized, thus less likely to incur expenses associated with injuries (Miller, Zaloshnja, & Hendrie, 2006; Pressley, et al., 2009)
- Human error contributes to unsafe practices that can lead to increased cost, injuries and deaths. The body of literature is very limited in this area, calling for further research to be conducted.
- The specific type of restraint used largely determines the type and severity of the injury. For instance, rear facing CSRSs prevented serious trauma and resulted in fewer head and neck injuries (Zuckerbraun, Morrison, Gaines, Ford, & Hackam, 2004).

Lessons Learn from the Literature Review

- In 2011, a panel of experts convened and compiled 2 evidenced-based reports on child passenger safety (1-Technical and 1-Policy)(Durbin, CIVPP-Technical Report, 2011a; Durbin, CIVPP-Policy Statement, 2011b).
- Five evidence-based recommendations to optimize safety in passenger vehicles for children of all ages:
  - "(1) All infants and toddlers should ride in a rear-facing car safety seat until they are 2 years of age or until they reach the highest weight or height allowed by the manufacturer of their CSRS.
  - (2) All children 2 years or older, or those younger than 2 years who have outgrown the rear-facing weight or height limit for their CSRS, should use a forward-facing car safety seat with a harness for as long as possible, up to the highest weight or height allowed by the manufacturer of their CSRS

Lessons Learn from the Literature Review

- (3) All children whose weight or height is above the forward-facing limit for their CSRS should use a belt-positioning booster seat until the vehicle lap-and-shoulder seat belt fits properly, typically when they have reached 4 feet 9 inches in height and are between 8 and 12 years of age.
- (4) When children are old enough and large enough to use the vehicle seat belt alone, they should always use lap-and-shoulder seat belts for optimal protection. (5) All children younger than 13 years should be restrained in the rear seats of vehicles for optimal protection (Durbin, CIVPP- Policy Statement, 2011b, pg. 789-791).

- Identifying and understanding driver demographics (driver's age, gender, annual household income, race/ethnicity and educational status) and characteristics have the potential to have a significant impact on whether a child is placed or not placed in a CSRS.

Lessons Learn from the Literature Review

- The literature review suggest a strong positive relationship between properly restrained children in CSRSs or safety belts having less serious injuries than children that are unrestrained or improperly restrained in MVCs.
- The literature established the relationship between motor vehicle crashes involving children legislation, health behavior response to legislative regulations, costs, safety seat use, proper use, seating positions in motor vehicles, premature graduation, time of day, misuse, driver demographics impact on child restraint use, and vehicle type.

Problem Statement

- There continues to be misuse as well as non-use of child passenger restraint systems for those age groups who are legally mandated to use them despite legislative advances (NCIPC, CDCP, VS, 2014; Safe Kids CT, 2013; Rogers, Gallo, Saleheen, & Lapidus, 2013).

- Identifying CSRS misuse patterns and gaining a better understanding of these flaws in legislative policies, may allow insight into non-compliance of these laws (deliberate or non-deliberate).

Purpose of the study

- To evaluate the effectiveness of Connecticut General Statutes § 14-100a, specifically Public Act 05-58 that went into effect October 1,2005
- Legislative intent is to ↓ risk of child passenger injuries and death (Conn.Gen Stat., 2006)
- Identify & understand variables that can ↑ CSRS use

Research Questions

(1) Is there is a difference in the prevalence of car seat use in children ages six years and younger who have been involved in a motor vehicle crash pre as compared to post implementation of Connecticut's car seat law that went into effect in 2005?

(2) Which variables best predicts the use of child safety restraint seats (CSRS) (dependent variable) for children ages six years and younger who have been involved in a motor vehicle crash?

(3) Which variables best predict early transition from a CSRS to a seat belt?

Independent & Dependent Variables

- The independent variables of interest were crash time, crash severity, driver sex, vehicle type, driver age, drug or alcohol use, occupant age, seating position.

- The dependent variable was the occupant protection system used (child safety restraint seats (CSRS))

Theoretical framework

- Diffusion of innovations theory "is the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p.5).
- It is the process that occurs as individuals adopt a new product, practice or new way of thinking (Rogers, 2003).
- The diffusion of innovation can be applied to the concept of legislation integration in the local, state and national community.
- The diffusion of innovations framework was used to examine the diffusion of CT's child passenger safety law and its impact on the use of CSRS.

Design

- A descriptive, cross-sectional, retrospective, quantitative study was conducted utilizing the CT Crash Data Repository (CTCDR), established in the fall of 2011 and officially launched on April 29, 2013(E. Jackson, personal communications, July 1, 2014).

- Timeframe- January, 2000 to December, 2010 (5 year before and 5 years after the law went into effect)

- 2005 data excluded (year the law went into effect)

Participants and Sample Size

- Motor vehicle occupants, 6 years of age and younger who were involved in a MVC. (Based on CT law)
- There were roughly 988,976 MVCs that occurred on CT roadways of which 67,797 MVCs (14.6%) that involved children 6 years of age or less involving a total of 89,966 children.

Participants and Sample Size

- A total of 36,737 MVC records (including 153 records from fatal crashes) identified to use for this analysis (an additional 54,909 records were excluded due to no injuries reported in the MVC).
  - Police reporting of restraint use was less accurate for non-injury crashes (as there is minimal investigation) thus the dataset was limited to injury only crashes (E. Jackson, personal communications, December 17, 2014).
- An *a priori* decision was made to randomly select only one child passenger to be included in the analyses from each vehicle in the dataset that had more than one child occupant to remove some potential biases.
- Final dataset contained 21,663 records (1,425 or 6.6%)missing data (excluded); 20,238 with valid data)
- All analyses were conducted using SPSS version 19 (IBM Corp).

Methods

Research Question 1

- The analysis consisted of a binary logistic regression examining the proportion of those children ages 6 and under that were in a CSRS before and after the law change.
  - Included year as a covariate to control for any pre-existing trends.
  - Data from 2005 was excluded since the law was enacted on October 1, 2005 (included both pre and post law data)

Methods

Research Questions 2 and 3

- Both SPSS and SAS analysis programs were run to determine the best fit model to predict restraint use by running a backwards stepwise logistic regression.
- The final product was a model that best predicted proper restraint use given all the variables.
- The variables were treated as categorical and where possible were recoded into aggregate categories (For example: restrained versus not restrained; child safety seat versus no child safety seat; proper use versus not proper use, etc.).

Methods

Research Questions 2 and 3 cont.

- The operational definition for proper use was in concert with CT law
  - Any child 6 years of age or less who should have been restrained in a CSRS while traveling in a motor vehicle.
- Children restrained with a seatbelt that by law should have been in a CSRS were considered not properly restrained and determined to have been prematurely transitioned.
- Data with missing variables (e.g. unknown sex, age, etc.) were excluded from the analyses.

Methods

- No cleaning and screening procedure
  - Existing dataset cleaned and tested by Connecticut Department of Transportation Highway Safety Office (HSO) prior to being made available for public use.
  - HSO has a standardized internal process and conducts regular system checks and balances.
  - If any errors or discrepancies were identified, they were rectified either by the HSO (for roadway locations) or with the reporting law enforcement official prior to the data being released to the dataset.

Coding Discrepancy

- Alcohol/Drug use was not included as a variable because 99.4% of the records were recorded as "None-Indicated/Unknown." Since this was a single code, it could not be separated out further to determine which records differentiated the alcohol/drug variable in those drivers who did not use alcohol/drug, from those drivers for whom the law enforcement official did not determine use.
- Although the *N* for this variable was small, a cross tabulation showed that for the 50 drivers who were identified as positive for alcohol/drug use, proper CSRS use for the child was 64% compared to 79% for those who were not known to be positive ($\chi^2 = 6.7$, $p < 0.01$).

Coding Discrepancy (cont.)

- Vehicle Type was included as a variable; however, the PR-1 form used by law enforcement officials does not specify the individual type of passenger vehicle (i.e. SUV, van, or small truck).
  - The level of distinction was between passenger vehicle and commercial vehicles (i.e. bus, 18-Wheeler, large trucks, box trucks and motorcycles).
- The gender of the child occupant was excluded from the analysis
  - Only collected for the pre-law period and not collected for the post-law years for comparison (personal communications E. Jackson, December 17, 2014).

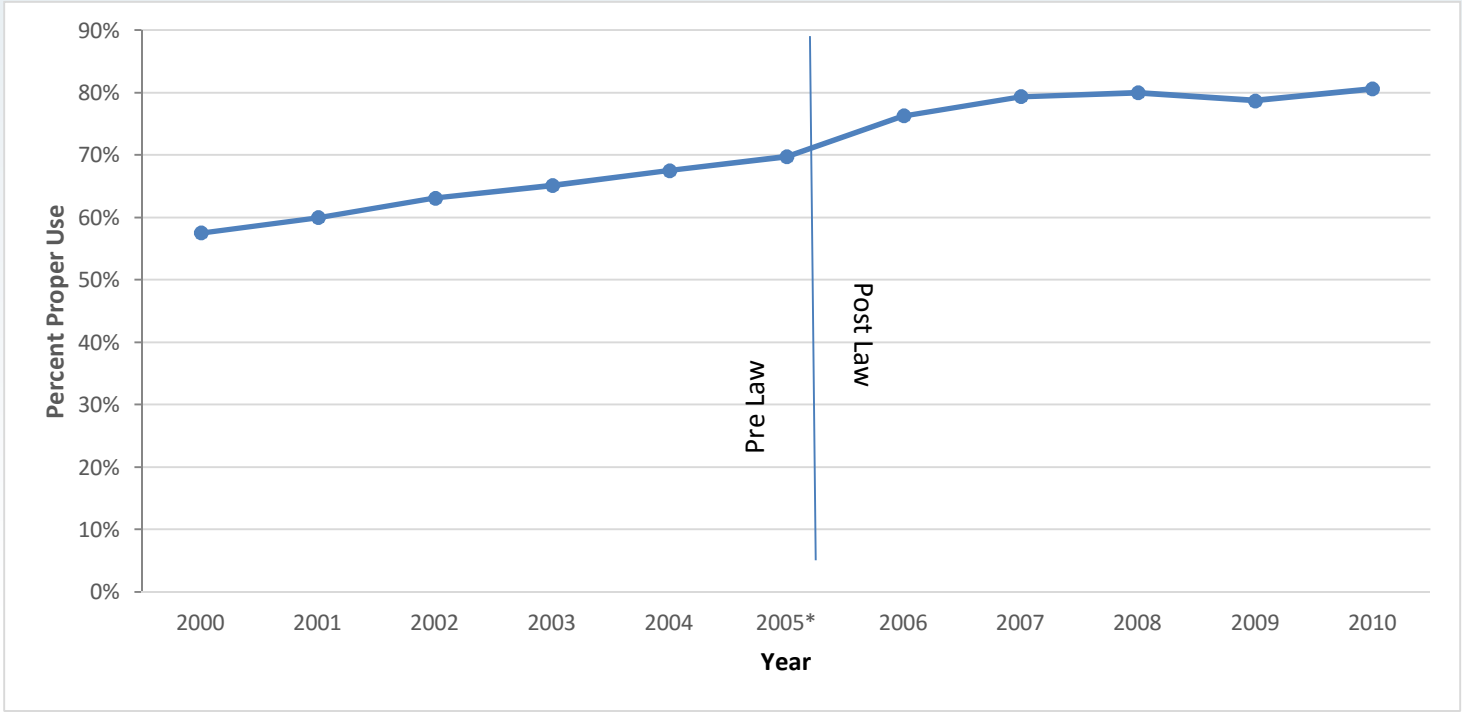
Coding Discrepancy (cont.)

- Seat position was originally included as 1st , 2nd and 3rd row, but later recoded to "front and back seat" since the *N*'s (716) of the 3rd row seat were relatively few (3%) but also, and perhaps more importantly, because of the potential confound of vehicle type created by breaking out the third row.
- That is, in every case the passengers seated in a third row would have been in an SUV or van exclusively whereas second row seating could include a passenger car and pickup truck as well.
- Thus there were 1,247 children seated in the front row (pre law: 931; post law: 316) and 20,096 seated in the second and third rows (pre law: 11,114; post law: 8,982) combined.
- There were 320 records excluded from this analysis because the seating position was unknown or in a non-valid seating position (e.g. cargo area or driver seat) (pre law: 185; post law: 135)

Results- Data Distribution

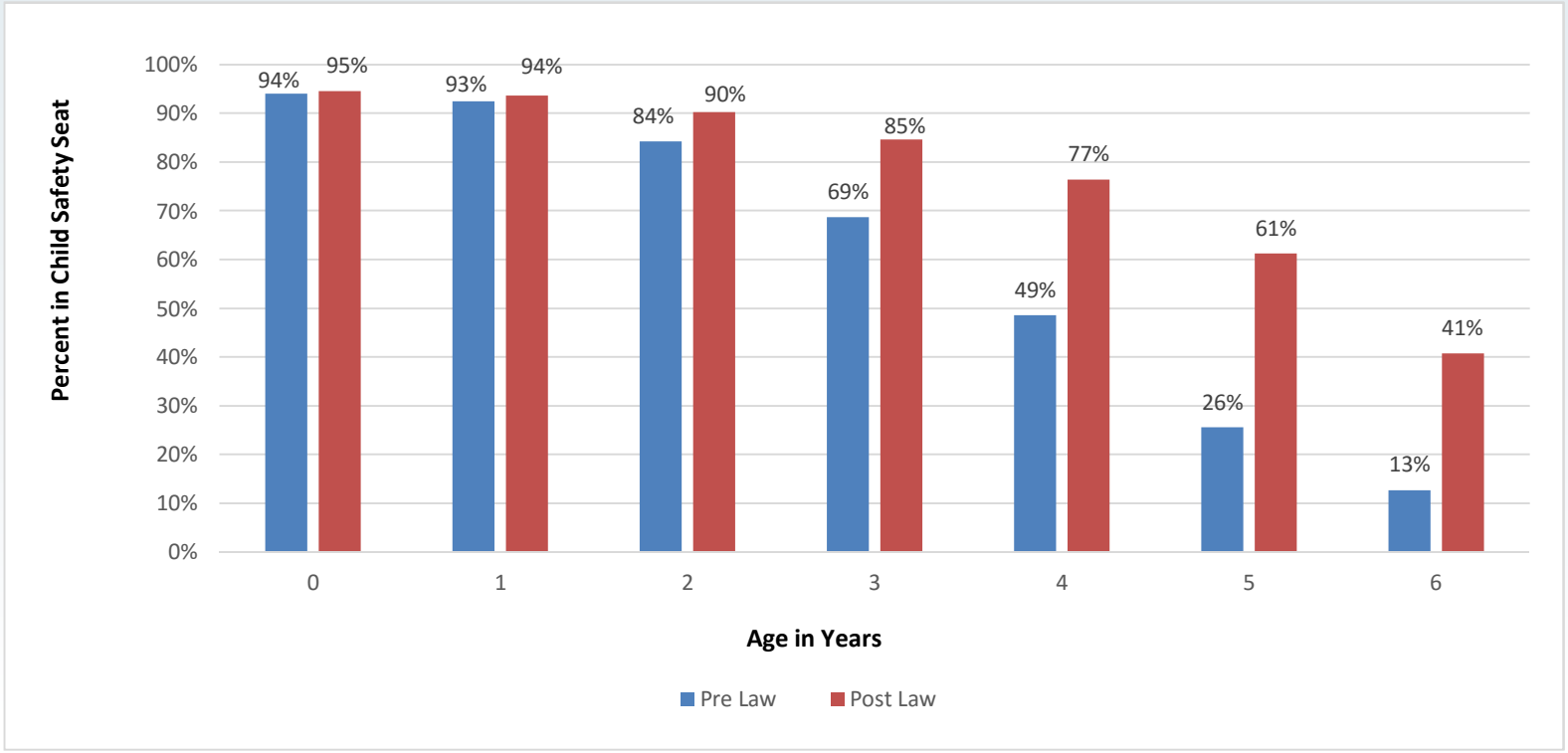
- The data distribution across years included a total of 12,230 children pre legislation and 9,433 children post legislation MVC records (21,663 total records).
- The distribution was fairly equal across all age groups .
- These numbers excluded the 2,111 (107 with missing seat belt/child restraint use) from 2005, the year legislation went into effect and as described in the study design.
- For the years included in the analyses, 69.7 percent (14,116, not including the 1,398 from 2005) were restrained in car seats .

Child Safety Seat Use by Year



*2005 data excluded

Pre and Post Law Child Safety Seat Use



Results Summary

- Child age was the independent variable most strongly associated with car seat use.
- Infants (under 1 year of age) were more likely than school-aged children to be placed in car seats (OR 12.6; 95% CI: 9.7-16.4), while toddlers were 5.9 times more likely (95% CI: 5.2-6.7).
- Female drivers, driving during the day or evening and sitting the child in the back seat were all also independently associated with a higher likelihood of car seat use.
- The age of the driver was not statistically significantly associated with car seat use after adjusting for the other variables in the model.

Results Summary

- The younger the child the higher the likelihood of car seat use.
- 95% of infants less than one year of age were in a child safety seat followed by 90% of toddlers 1-3 years and 60% of school age children ages 4-6 years.
- Total of 79% of children across all these age groups reported to be in a child safety seat as compared to 21% not in a child safety seat.
- Younger adults (under 36yr.) tended to have the child occupants in a proper seat more frequent than did older drivers . However, the effect of driver age did not reach statistical significance.
- Male drivers were 1.2 times less likely to have their child occupants in a child safety seat (77%) than did female drivers (79.8%). This effect was statistically significant ($\chi^2 = 8.43$, $p < .01$).

Results Summary

- Driving later in the day was associated with lower child seat use.
- Drivers traveling during the daytime were 1.7 times more likely to restrain the child occupants (80%) than those driving at night (70.7%).
- Drivers traveling during the evening were 1.5 times (77.1%) more likely to restrain the child occupant than those driving at night.
- There was a sizable effect of seat position . Children were restrained in the front seat only 44 % of the time but were properly restrained in the back seat 80 % of the time.
- In addition, children were 5.3 times less likely in the front seat than the rear seats.

Results Summary

- Infants were 13.9 times less likely to be transitioned earlier than school-age children (OR 0.72; 95% CI: 0.55-0.10) and toddlers were 6.4 times less likely than school age children (OR 0.16; 95% CI: 0.14-0.18).
- Seat position was also strongly related to early transition. Children in the front seat were 5.2 times more likely to be in an adult restraint system than children in the back seat (OR 5.2; 95% CI: 3.9-6.8).
- Men were 1.2 times more likely to transition their child occupants to an adult restraint system than were women (OR 0.84; 95% CI: 0.74-0.95).
- Time of day also predicted early transition with drivers traveling during the day being 1.5 times less likely to have children in lap/shoulder belts than those driving at night (OR 0.65: 95% CI: 0.52-0.82) and those riding in the evening being in shoulder/lap belts 1.3 times less often than those riding at night (OR 0.75; 95% CI 0.59-0.96).

Discussion

- There was a statistically significant increase in child safety seat use after the law was strengthened in 2005.
- These results indicated that the youngest child occupants (<4 years old) had the highest child safety seat use both pre and post law and thus, the law did not lead to a statistically significant increase in child safety seat use for these ages.
- However, the law had a positive impact on child safety seat use for older children (ages four, five and six). That is, CSRS use significantly increased from pre to post law change for these older children.
- Driver sex, crash time, child occupant age, and child occupant seating position were all significant predictors of whether or not a child was in a child safety seat during a MVC.
- Four variables (child age, seating posting, driver sex and time of day) were identified as significant predictors of car seat use and early transition to a seat belt.

Disucssion

- The results also indicated that several factors were predictors of early use of a lap/shoulder belt (versus child safety seat) in the time period following the law implementation.
- Specifically child occupant age, driver sex, time of day, and child occupant seating position were all significant predictors of whether a child was in a child safety seat versus a lap or shoulder belt during the crash.
- That is, that younger the child the more likely they would be associated with early transition to an adult restraint system (lap and/or shoulder belt);
- That children placed in the front seat were more likely to not be in a CSRS; that men were 1.2 times more likely to transition their child occupants to an adult restraint system than were women;
- That drivers transporting children in motor vehicles in the daytime were more likely to not have children in CSRS, who by Connecticut state law should have been.

Discussion

- The results of this study suggest that the impact of Connecticut General Statutes § 14-100a, specifically Public Act 05-58, which went into effect in 2005, is effective in children being placed in CSRS.
- Increased use of CSRSs had a protective effect on the safety of children transported in motor vehicles.
- As a result, there were many children that avoided injury and even death because of this law, especially in the four, five and six year old age groups whose usage rates increased 28 percentage points, 35 percentage points, and 28 percentage points, respectively.

Limitations to the Study

- May not be generalizable to the general public and may only apply to those individuals more likely to be involved in MVCs.
- Subjects were not randomly selected but limited to those occupants involved in MVCs potentially affecting the external validity of the study. That said this population is the most important in terms of understanding predictors of restraint use.
- Another limitation was that data were obtained from only one electronic database that was dependent on the accuracy of the MVC documentation of law enforcement officials and data entering of reports from CT DOT personnel.

Implications (for Positive Social Change)

- This study highlighted areas of legislative policy and child passenger safety practices that need further attention.
- Results indicated that male drivers transition children from CSRSs to seatbelts faster that female drivers and that older drivers transition children from CSRSs to seatbelts faster than younger drivers.
- Targeted campaigns educating both of these groups could help to change these dangerous behaviors.
- Legislation that strengthens child passenger safety has the potential to decrease the overall number of child passenger injuries and fatalities, which would ultimately increase the safety of child passengers transported in motor vehicles.

Implications (for Positive Social Change**)**

- The positive effect on the safety of children could be even greater if law was expanded to include older children and require booster seat use until age 12.
- If legislation for this older age group worked the same as the current law, there would be an increase in proper CSRS use (i.e. child positioned in back seat) and potential to save even more children from injury and death.
- Certain targetable variables, such as driver sex and child age, were identified as significant predictors of car seat use and early transition to a seat belt.
- Results should be used to guide program planning, targeted injury prevention efforts that would ultimately decrease medical costs, save lives, and prevent injuries.

Conclusion

This study establishes:

- Significant predictors of child safety seat use and early transition to a seat belt that could lead to targeted interventions and a positive impact on the health and well-being of Connecticut's children.
- Confirms that Connecticut legislation is effective.
- Influence on decisions for health policy refinement as well as focus injury prevention program planning.
- Sets the stage for future successes that might be gained by lobbying for and recommending expansion of Connecticut's General State Statute § 14-100a, specifically Public Act 05-58, which went into effect in 2005.
- Educating legislators, medical professionals and other safety advocates and seeking their support to improve legislation to benefit one of our country's most vulnerable populations – children.

What if?

- 100% compliance with CPS
  - Save 1000 children's lives per year
  - Prevent 25000 hospitalizations/injuries

Thank You and Acknowledgements

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- All Child Passenger Safety Technicians and Instructors in CT and US

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THANK YOU!

- Yale-New Haven Children's Hospital Injury Prevention, Community Outreach & Research Center supports ongoing education, training and resources
- Working to increase our role in the local community and across the state

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203-200-KIDS

Seat Belt Syndrome

Belt rises over pelvis into abdomen

1. Bruise to abdomen
2. Fracture/subluxation of L-spine
3. Visceral injury (50%)
    - Liver
    - Spleen
    - Pancreas
    - Bowel

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Binary Logistic Regression Restraint Use Pre versus Post Law by Age Category

Child Age						95% C.I.for Odds Ratio	
Category		χ2	p value	Odds Ratio	B	Lower	Upper
Infant	Pre-post Law	.250	.617	1.208	.189	.575	2.536
	Year	.745	.388	1.051	.050	.939	1.177
	Constant	.703	.402	.000	-96.979		
Toddler	Pre-post Law	.153	.696	1.058	.056	.798	1.403
	Year	28.875	.000	1.120	.113	1.075	1.167
	Constant	28.331	.000	.000	-225.467		
School Age	Pre-post Law	13.937	.000	.666	-.407	.538	.824
	Year	77.454	.000	1.158	.147	1.121	1.197
	Constant	77.232	.000	.000	-294.819		

Driver Sex, Driver Age and Time of Crash Distribution

			N	Percent
Driver Sex	Pre Law	Female	8,298	67.8
		Male	3,890	31.8
		Missing/Unknown	42	0.3
	Post Law	Female	6,442	68.3
		Male	2,959	31.4
		Missing/Unknown	32	0.3
Driver Age	Pre Law	<22years	1,138	9.3
		22-35 years	6,585	53.8
		36-54 years	3,837	31.7
		55+ years	548	4.5
		Missing/Unknown	122	1.0
	Post Law	<22 years	775	8.2
		22-35 years	5,057	53.6
		36-54 years	3,076	32.6
		55+ years	449	4.8
		Missing/Unknown	76	0.8
Time	Pre Law	Morning 6AM to 4:59 PM	8,229	67.3
		Evening 5PM to 8:59PM	3,206	26.2
		Night 9PM to 5:59AM	795	6.5
	Post Law	Morning 6AM to 4:59 PM	6,423	68.1
		Evening 5PM to 8:59PM	2,411	25.6
		Night 9PM to 5:59AM	599	6.4

Backwards Stepwise Binary Logistic Regression Predicting Car Seat Use

					95% C.I. for Odd Ratio	
Categories	χ^2	p value	Odds Ratio	B	Lower	Upper
Child Age Category	948.518	.000				
Infant vs. School-Age	352.180	.000	12.621	2.535	9.685	16.448
Toddler vs. School-Age	745.034	.000	5.884	1.772	5.181	6.683
Driver Age Category	7.332	.062				
0-21yr versus 55yr+	.002	.968	.993	-.007	.720	1.370
22-35yr versus 55yr+	3.414	.065	1.267	.236	.986	1.627
36-54yr versus 55+	1.377	.241	1.164	.152	.903	1.501
Driver Sex Category (Female Vs. Male)	8.428	.004	1.197	.180	1.060	1.352
Time of Day Category	26.352	.000				
Daytime vs Night	23.722	.000	1.733	.550	1.389	2.163
Evening vs Night	10.406	.001	1.475	.388	1.165	1.867
Seating Position (Front Seat vs Back Rows)	143.336	.000	.190	-1.658	.145	.250
Constant	2.902	.088	.758	-.277		

Backward Stepwise Logistic Regression Predicting Early Transition

					95% C.I. Odds Ratio	
	χ^2	p value	B	Odds Ratio	Lower	Upper
Child Age Category	980.469	.000				
Infant to School-Age	339.772	.000	-2.629	.072	.055	.095
Toddler to School-Age	764.373	.000	-1.855	.156	.137	.178
Driver Sex Category (Female vs Male)	7.345	.007	-.171	.842	.744	.954
Time of Day Category	15.397	.000				
Morning to Night	13.034	.000	-.431	.650	.515	.821
Evening to Night	5.117	.024	-.287	.750	.585	.962
Seating Position (Front Seat vs Back Rows)	131.901	.000	1.639	5.151	3.894	6.814
Constant	.232	.630	-.058	.943		

10 leading causes of death, United States (<1 to 24 years) 2010, all races, both sexes

Rank	Age groups (years)					
	<1	1-4	5-9	10-14	15-19	20-24
1	Congenital anomalies 5107	Unintentional injury 1394	Unintentional injury 758	Unintentional injury 885	Unintentional injury 4537	Unintentional injury 7804
2	Short gestation 4148	Congenital anomalies 507	Malignant neoplasms 439	Malignant neoplasms 477	Homicide 1832	Suicide 2941
3	SIDS 2063	Homicide 385	Congenital anomalies 163	Suicide 267	Suicide 1659	Homicide 2846
4	Maternal pregnancy complications 1561	Malignant neoplasms 346	Homicide 111	Homicide 150	Malignant neoplasms 601	Malignant neoplasms 1003
5	Unintentional injury 1110	Heart disease 159	Heart disease 68	Congenital anomalies 135	Heart disease 342	Heart disease 686
6	Placenta cord membranes 1030	Influenza & pneumonia 91	Chronic low. respiratory disease 60	Heart disease 117	Congenital anomalies 202	Congenital anomalies 210
7	Bacterial sepsis 583	Septicemia 62	Cerebrovascular 47	Chronic low. respiratory disease 73	Cerebrovascular 86	Influenza and pneumonia 133
8	Respiratory distress 514	Benign neoplasms 59	Benign neoplasms 37	Benign neoplasms 45	Chronic low. respiratory disease 60	HIV 125
9	Circulatory system disease 507	Perinatal period 52	Influenza and pneumonia 37	Cerebrovascular 43	Influenza and pneumonia 48	Complicated pregnancy 121
10	Necrotizing enterocolitis 472	Chronic low. respiratory disease 51	Septicemia 32	Septicemia 35	Benign neoplasms 46	Diabetes mellitus 120

Reproduced from: National Center for Health Statistics (NCHS), National Vital Statistics System. Available at: www.cdc.gov/injury/wisqars/leading_causes_death.html. Accessed on August 20, 2013.